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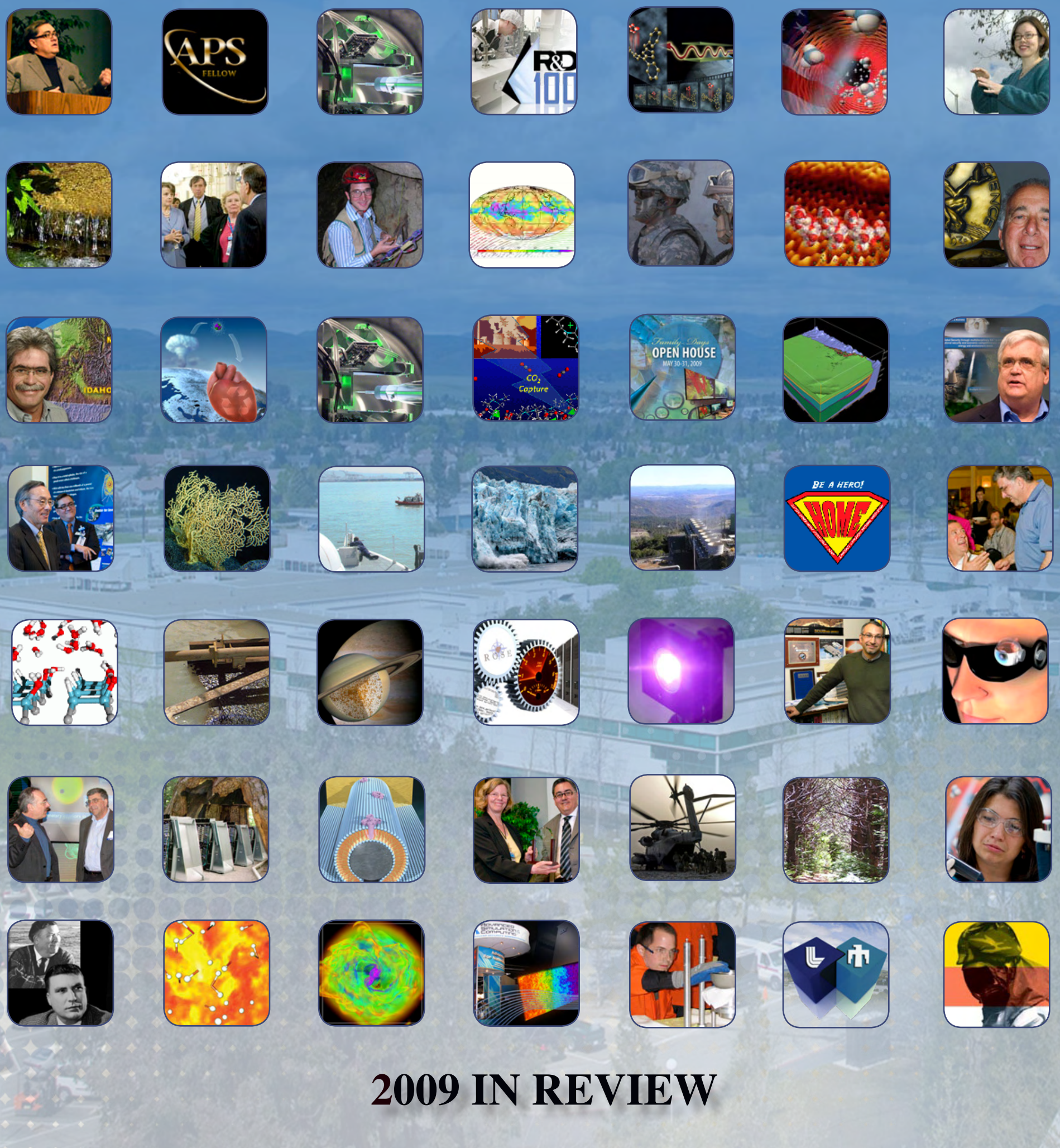

2009 IN REVIEW

Lab transitions to what it does best

"Transition is over," Director George Miller declared in a June all-hands address, noting the remarkable progress in making the Laboratory leaner, more efficient and adaptable since the transition to management by Lawrence Livermore National Security, LLC (LLNS) that began Oct. 1, 2007. Miller said the Lab is now better poised to address the great challenges facing the nation, from stockpile stewardship, nonproliferation and terrorism to energy and climate change.

Despite Miller's declaration, 2009 still saw plenty of transitions at the Lab as many programs checked off new milestones and research projects entered new phases.

In 2009, the Lab continued a long tradition of science and technology excellence in delivering on its National Nuclear Security Administration (NNSA) and DOE mission obligations. The National Ignition Facility (NIF), the world's largest and most energetic laser, was dedicated in a ceremony attended by national and state leaders and covered by media from around the world. NIF experiments, scheduled for 2010, will help resolve key nuclear weapons performance issues, demonstrate the potential of fusion as a future source of clean energy and provide insight into the very nature of the cosmos.

As NIF began the transition to an operational facility, the Advanced Simulation and Computing (ASC) program dedicated a new supercomputer, Dawn, a 500-teraFLOP/s (trillion floating operations per second) IBM system that is laying the foundation for Sequoia, a 20-petaFLOP/s (quadrillion floating operations per second) system that will usher in a new era in high-performance scientific computing. LLNL supercomputing capabilities will play a key role in the success of NIF experiments and serve to advance the broad range of Laboratory research. These efforts burnish Livermore's reputation as a global leader in scientific computing.

Emblematic of the Lab's scientific creativity and spirit of innovation are the record eight R&D 100 awards won by Laboratory research teams in 2009. Technologies receiving awards ranged from scientific computing, laser science, fusion energy and basic physics to an artificial retina that can restore sight to the blind. These are but a few highlights of LLNL's S&T accomplishments *(see awards and recognition pages 6-7)*.

The Laboratory's S&T accomplishments were recognized by NNSA's Livermore Site Office with an "outstanding" for S&T in its Performance Evaluation Report for FY 2009.

Operations & Management

LLNL developed the foundation for a Laboratory-wide budget performance system based on the components of the Earned Value Management System (EVMS), a best-practices approach to tracking project performance, and crafted a number of EVMS building blocks specific to LLNL. The Laboratory made excellent progress toward the goal of reducing the site footprint by 2 million square feet by FY 2011. The Lab has shutdown or demolished more than 875,000 square feet of space since the initiative began in FY 2008.

The Laboratory achieved savings of approximately $5.2 million per year by centralizing and streamlining responsibility for the acquisition, receipt and distribution of supplies and services. For example, this year the Lab's Procurement Services Department processed 10 percent more transactions at an 18-percent lower operating cost. The Laboratory also consolidated and centralized information technology services such as the management of desktop applications and unclassified networks. As part of this effort, more than 200 servers from 18 different facilities were consolidated into the LLNL Data Center, saving about $1 million annually.

> "I am very proud of the Laboratory's performance this past year."
>
> — Lab Director George Miller

Leadership changes

The year 2009 brought some changes to the Lab's senior management team. Science and Technology Principal Associate Director Cherry Murray left to take a position as the first woman to serve as dean of the School of Engineering and Applied Science at Harvard University. Tomás Díaz de la Rubia was named to take her place in an acting capacity.

John Doesburg, principal associate director for Global Security, left in October to take a position at Oak Ridge National Laboratory. He was succeeded by Parney Albright in November. In December, Frank Russo, principal associate director for Operations and Business, announced that Bechtel was transferring him to Richland, Wash. Don Boyd was named to fill that position in an acting capacity.

In January, Computation Associate Director Dona Crawford was appointed also to serve as the Lab's chief information officer (CIO) and associate program leader for cyber security. Her appointment was part of a realignment that moved former CIO Ken Neves to full-time chief information adviser (CIA) for both LLNL and Los Alamos National Laboratory.

Allen Macenski, director of Environment, Safety, Health and Quality, stepped down to take a position with a LLNS parent company and was replaced by Steve Wuthrich. Michael Merritt was named associate director for Nuclear Operations in December, a post he had occupied in an acting capacity since May. He replaced Jerry Paulson, now senior technical adviser to the Operations and Business Principal Directorate. Security Organization Director Dave Leary retired after a 36-year Lab career. He was succeeded by John Lewis.

Paul Ehlenbach was selected as Laboratory general council in May after a nationwide search. In January, Bill Bruner, formerly with the National Aeronautics and Space Administratioin (NASA), was hired as director of the newly created LLNL Office of Government and External Relations, which includes the Public Affairs and Protocol offices; Jim Bono was selected as director of Public Affairs.

Community

The Laboratory's annual Helping Others More Effectively, or HOME, campaign raised a record $3 million for local nonprofits, which includes $1 million in matching funds from LLNS. The LLNS gift program also provided $100,000 direct investment into community programs supporting math and science education and cultural arts.

The Laboratory also received approval from NNSA to develop the concept for a Livermore Valley Open Campus (LVOC). The proposed LLNL-Sandia/California joint venture would create a shared space between the two adjacent laboratories to promote collaboration with industry and academia and help establish the Livermore Valley as a high-tech center in the East Bay.

These are but a few highlights from an exceptional year *(see the Annual Report for more details)*. Following are selected highlights, listed month by month, for calendar year 2009.

IN REVIEW 2009

A month-by-month glance of the year's highlights

JANUARY

Science & technology

Research conducted by **LLNL and University of California scientists** shows how massive stars form without blowing away the clouds of gas and dust that feed their growth. The study appears in an edition of *Science Express*.

The Lab launches its new series of community lectures called **"Science Chats,"** held at the Livermore Library, to mark the Year of Science 2009.

Lab researchers discover **a method to dissolve an explosive material** that improves its quality and performance once it is reverted back to a solid. The research appears in the January issue of *New Journal of Chemistry*.

The Laboratory signs a **research agreement with Chevron** to develop the next generation of catalysts for production of cleaner, more efficient fuels from crude oil.

The Lab's popular **"Science on Saturday"** lecture series kicks off another year to a large crowd at Livermore's Bankhead Theater with "Aerogels: The Materials Science of Empty Space."

Dawn, a 500-teraFLOP/s IBM BlueGene/P system that will help lay the foundation for the 20-petaFLOP/s Sequoia system is delivered to the Lab, launching a new era in scientific computing.

NIF project construction officially comes to an end with the installation of a shoebox-sized instrument known as a SIDE camera.

People

Mitchell Kapor, founder of Lotus Development Corporation and the developer of Lotus 1-2-3, is the opening speaker in the Lab's new **"Science and Society" program series,** sponsored by the Office of Strategic Diversity Programs.

Historian and author Thomas Reed, a former weapons designer in A Division, returns to the Lab to present the talk, **"A Political History of Nuclear Weapons, 1938-2008."**

> "We're putting benign trash (CO_2) into the atmosphere, and cleaning up costs money. No one gets a free lunch. We have to do what makes sense and what's safe,"
>
> **– Lab scientist Roger Aines on the Big Sky Carbon Sequestration Partnership.**

The Martin Luther King, Jr., annual observance focuses on the historic inauguration of Barack Obama as the 44th president of the United States.

LLNL researcher Tom Casper is selected for a new position as scientific officer in Equilibrium and Control, Fusion Science and Technology at the International Thermonuclear Experimental Reactor (ITER) in Cadarache, France.

Senior scientist Karl van Bibber is tapped to be the vice president and dean of research of the Monterey-based Naval Postgraduate School (NPS).

The Hazards Control Department announces the appointment of **Steven Lee** as the Beryllium Program Subject Matter Expert.

NIF technicians John Hollis, right, and Jim McElroy, left, install the project's final line replaceable unit.

Erich Bloch, director of the Washington Advisory Group, member of the President's Council of Advisors on Science and Technology and former director of the National Science Foundation, gives a Director's Distinguished Lecture Series talk about **"National Research Priorities."**

Brooke Buddemeier of Global Security's Risk and Consequence Management Program delivers presentations for a nuclear terrorism response workshop hosted by the Los Angeles County Department of Public Health in Los Angeles.

Operations

A water conservation test bed project, part of a DOE initiative to reduce water usage through the implementation of a reclaimed water collection and distribution system, gets under way at the Livermore site.

The new **Microsoft Office 2007/2008** suite is successfully deployed to nearly 8,500 computer systems in the Lab's first-ever enterprise-wide software distribution initiative using automated tools.

FEBRUARY

Science & technology

Lab scientist **Roger Aines** spearheads an effort to look at sequestering carbon dioxide (CO_2) produced by coal or natural gas power plants in geological formations in Montana and Wyoming.

The **Lab's National Ignition Facility (NIF)** takes center stage at the American Association for the Advancement of Science (AAAS) annual conference in Chicago.

The Laboratory signs an agreement with **Siemens Energy, Inc.,** to provide high-resolution atmospheric modeling capabilities to improve the efficiency of wind farm sites, turbine design and wind farm operations.

Lab physicists develop **radiation calibration measurements for the auxiliary lymph nodes around the pectoral muscle,** marking the first time the capability has been developed and implemented.

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2009 IN REVIEW

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Using images from NASA's Hubble Space Telescope, Kem Cook and colleagues are part of a collaboration that creates an exceptionally deep view of a strange spiral galaxy, dubbed **NGC 4921**, in the Coma Galaxy Cluster.

People

President Obama, introduced by newly appointed Energy Secretary Steven Chu during a brief address, thanks DOE employees saying "your mission is so important and it is only going to grow."

Robin Newmark of Global Security shepherds the Lab's donation efforts of two water treatment units stored at the Lab's main site. The units are relocated to the University of California, Santa Cruz (UCSC), Center for Integrated Water Research.

Lab scientist **Bruce Cohen** is selected to become a new member of the Fusion Energy Scientific Advisory Committee (FESAC).

Operations

The Engineering Directorate celebrates the graduation of apprentices from the **LLNL machinist apprenticeship program**.

Bldg. 264 becomes the first in the Department of Energy complex to achieve certification as a green building under the U.S. Green Building Council's (USGBC) new rating system for existing buildings.

The annual **Tri-Valley Expanding Your Horizons (EYH)**, co-sponsored by LLNL, returns to San Ramon, drawing more than 300 young women participants.

Director George Miller announces the re-start of the **Lab's Service Award Program**.

MARCH

Science & technology

For the first time, **NIF** control room technicians test all 192 of the laser's beams, firing them simultaneously into the 10-meter-diameter target chamber.

Livermore researchers discover a **novel gooey tantalum structure** that occurs before the metal melts under stress at high pressures. The work is published in *Nature Materials*.

> "Scientific simulation is the telescope of the mind."
>
> **– Mark Seager, assistant department head for Advanced Technologies in the Computation Directorate, on the increasingly important role that high-performance simulations play in scientific discovery, in a *Wired* magazine article.**

Even under eight million atmospheres of pressure, the mineral diamond remains solid, strong and in the **diamond phase**. In an article published in *Physical Review Letters*, Lab scientists discover that this is the highest pressure, solid-state equation-of-state data ever reported.

The **National Ignition Facility** marks another milestone in laser physics history on March 10 at 3:15 a.m., becoming the first laser facility in the world to break the megaJoule barrier, delivering 1.098 MJ of ultraviolet energy to the center of the target chamber.

LLNL is recognized as a key contributor to the **Next Generation Safeguards Initiative,** which aims to train the next generation of safeguards professionals.

By reversing a process that converts electrical signals into sounds heard out of a cell phone, researchers may find **a new tool to enhance the way computer chips, LEDs and transistors are built.**

During a Science on Saturday lecture, students use a weather balloon to demonstrate the force of laser beams on a target.

Laboratory scientists show that **water,** in hot dense environments, plays an unexpected role in catalyzing complex explosive reactions. The research is published in a new journal, *Nature Chemistry*.

People

Thomas Friedman, foreign affairs columnist for the *New York Times* and author of the No. 1 bestseller "The World Is Flat," speaks at LLNL, looking at the challenges of climate change and the rising worldwide competition for energy.

Cherry Murray, LLNL's principal associate director for Science and Technology, is tapped to be dean of the School of Engineering and Applied Sciences at Harvard University.

Laboratory health physicist **Brooke Buddemeier** is elected to the National Council on Radiation Protection and Measurements (NCRP).

Kathy Vaselopulos, who had managed the Lab's Prime Contract Management Office since October 2007 and the LLNS office, leaves the Lab for a post with Babcock & Wilcox. Paul Rosenkoetter replaces her.

APRIL

Science & technology

LLNL scientist **Bruce Buchholz** with colleagues from four other institutions find that cells in a human heart can develop into adulthood and that the age of heart cells is, on average, six years younger than the individual.

Research by an international team of astronomers, including **Adam Stanford** of LLNL, shows a new picture of galaxy assembly in which Bright Cluster Galaxies experience an early period of rapid growth.

Researchers from the Laboratory, Stanford University and the University of California, Santa Cruz determine that two groups of **Hawaiian deep-sea corals** are far older than previously recorded.

Lab researchers report that **seeds of some tree species in the Panamanian tropical forest** can survive for more than 30 years before germinating, about 10 times longer than most field botanists had believed. The research is published in *The American Naturalist*.

The **National Atmospheric Release Advisory Center (NARAC)** celebrates its 30th anniversary.

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From left: Rep. Ellen Tauscher and Sen. Dianne Feinstein listen to a presentation during the National Ignition Facility (NIF) dedication.

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People

Jim Candy's new book on signal processing, "Bayesian Signal Processing: Classical, Modern and Particle Filtering Methods," is published by Wiley-Interscience.

Zsolt Jenei, a physicist from Romania working at the Laboratory, is featured in a *New York Times* audio interview included as part of a series of articles on immigration.

The Institute of Mechanical Engineers elects **Keith Carlisle** a fellow for his international record and contributions to the field of precision engineering.

In a speech to the DOE complex, **Energy Secretary Steven Chu** says U.S. national security labs are charged with "incredibly important missions" and that those missions will continue for the foreseeable future.

Operations

NNSA certifies the completion of the historic effort to build the world's largest laser, the **National Ignition Facility.**

In solidarity with the law enforcement community, 11 members of the **Protective Force Division** and two Alameda County firefighters stationed at LLNL represent the Laboratory at the March 27 memorial service for the four Oakland police officers killed in the line of duty.

The Laboratory completes version 1.0 of its **five-year science and technology investment roadmap.**

The Laboratory along with three Bay Area cities, four companies and a community college sign a memorandum of agreement with the **U.S. Army Reserve, the Northern California Employer Partnership Initiative.**

MAY

Science & technology

With well more than 3,000 invited guests and Lab employees in attendance, the **National Ignition Facility is officially dedicated.** Dignitaries in attendance include Gov. Arnold Schwarzenegger, Sen. Dianne Feinstein, NNSA Administrator Tom D'Agostino and Congressional Reps. Ellen Tauscher, Jerry McNerney and Zoe Lofgren.

The Laboratory dedicates its newest high-performance supercomputer, **Dawn,** a 500 tera FLOP/s (trillion floating operations per second) IBM system.

The Laboratory begins its celebration of the dedication of the National Ignition Facility with a **special symposium on the history of lasers and inertial confinement fusion research** at LLNL and the contributions of national and international collaborators over the last 50 years.

A new study featured on the cover of the May issue of *Ecological Monographs* reveals that, in some cases, the types of plants growing in an area could override the effects of climate change on wildfire occurrence. Laboratory scientist **Tom Brown** looks at the direct and indirect impacts of millennial scale climate change on fire occurrence in the south-central Brooks Range in Alaska.

A study led by Lab postdoc **Karis McFarlane and colleagues** shows that an increase in tree productivity in response to fertilization translates to more carbon sequestration in wood and forest floors in the Westside ponderosa pine region of northern California.

Several dozen military and law enforcement officials test their **radiation detection equipment** and polish their skills during a two-day San Francisco Bay exercise sponsored by LLNL and the Monterey-based Naval Postgraduate School.

> "I heard the talks they gave on fusion energy and I decided right then: 'I want to do that.'"
>
> **– Jeff Latkowski, a NIF engineer, on talks by Mike Campbell and Erik Storm he heard as a summer student in the 1980s.**

Jeff Wagoner of the Atmospheric, Earth and Energy Division uses three-dimensional geologic codes to create a detailed model of the southern San Joaquin basin where carbon dioxide (CO_2) could be stored underground.

The **Carbon Fuel Cycle Program,** part of the Global Security Principal Directorate, enters its second year in partnership with BP, StatoilHydro, Sonatrach and DOE studying carbon sequestration at the In Salah site in the Sahara Desert.

People

Herbert Frank York, the Laboratory's first director, dies May 19, in San Diego, Calif. He was 87.

Paul Ehlenbach, a seasoned attorney, is selected to serve as the Laboratory's new general counsel.

Steve Wuthrich is appointed as acting director of Environment, Safety, Health and Quality.

Ed Synakowski of the Lab's Physical and Life Sciences Directorate becomes the new head of the Department of Energy's Office of Fusion Energy Sciences.

Michael Merritt is appointed acting associate director for Nuclear Operations.

Chung Bothwell, a resource manager, is elected chair of the board of directors of the UNCLE Credit Union at its annual membership meeting.

Genevieve "Gen" Phillips, who had a long and distinguished career at the Laboratory providing indispensable administrative support to two Laboratory directors and the Physics Directorate, dies May 25. She was 85.

The husband-and-wife team of **Drs. István and Magdolna Hargittai** visit the Laboratory to interview a number of people who worked closely with Edward Teller as part of their research for a new book about Teller.

Amory Lovins, co-founder, chairman and chief scientist at the Rocky Mountain Institute, an independent, entrepreneurial, nonprofit think-and-do tank, visits the Laboratory.

J.D. Hokayama, CEO of Leadership Education for Asian Pacific Inc., (LEAP), kicks off Asian Pacific Heritage month activities.

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2009 TECHNOLOGY AWARDS & EMPLOYEE RECOGNITION

"Unfortunately, Mr. Secretary, I can't talk about it on the phone right now because it's classified."

– Omar Hurricane, when Energy Secretary Steven Chu called to inform him he had won the E.O. Lawrence Award.

Retired LLNL physicist and computational pioneer **Berni Alder** receives the National Medal of Science, the highest honor bestowed by the United States government on scientists, engineers and inventors, from President Obama at a White House ceremony.

The American Meteorological Society recognizes the **Program for Climate Model Diagnostics and Intercomparison (PCMDI)** with a special group award.

The S&T Principal Directorate honors recipients of the **2009 Science, Technology, Engineering and Operations (STEO)** awards at a luncheon.

Chemical Engineer **William Smith** garners the top award of the American Institute of Chemical Engineers (AIChE) Northern California Section.

The **Global Security Principal Directorate** receives an award from the National Safety Council for operating one million employee work hours without an occupational injury or illness involving days away from work.

NNSA's management of the **National Ignition Facility** receives an award for project management excellence by DOE this year.

Dylan Rood

Scott Samuelson, the NNSA NIF project director, receives the Federal Project Director of the Year Award.

Fred Mackie, a proliferation analyst in Z Program/Z Division for 30 years, is honored with the DOE Secretary's Exceptional Service Award in recognition of his three decades of "exceptional leadership and timely and insightful analyses of nuclear proliferation developments in South Asia."

A Laboratory-produced video about NIF takes first place in the 2009 Digital Video Awards international competition.

Ed Moses, principal associate director for the National Ignition Facility and Photon Science, and Riccardo Betti, professor and director of the Fusion Science Center of Extreme States of Matter and Fast Ignition at the University of Rochester, are awarded the 2009 Edward Teller Medal in recognition of their pioneering research and leadership in inertial fusion science and applications.

The Lab wins eight **R&D 100 awards,** sometimes called the "Oscars of Invention," bringing its total to 121 awards.

Laboratory scientists and engineers capture three awards for excellence in technology transfer from the **Federal Laboratory Consortium (FLC),** marking the most awards won this year by any laboratory among the more than 250 federal government laboratories and research centers that comprise the consortium.

Mark Seager, LLNL assistant department head for Advanced Technologies, is selected by *Federal Computer Week* magazine as one of the year's "Federal 100" top executives from government, industry and academia who had the greatest impact on government information systems in 2008.

LLNL scientist **Rick Ryerson** of the Physical and Life Sciences Directorate is named a fellow of the American Geophysical Union (AGU), a worldwide scientific community that advances the understanding of Earth and space for the benefit of humanity.

Ruth Tinnacher, a postdoc in the Lab's Physical and Life Sciences Directorate, receives an "Outstanding Graduate Student" award from the Colorado School of Mines in Golden, Colo., where she earned her doctorate in environmental science and engineering in December 2008.

Security Police Officer **Joseph Scott** of the Protective Force Division receives the Sydnor Award for his outstanding performance as a member of the DOE Composite Adversary Team.

Dylan Rood, a post-doc at the Lab's Center for Accelerator Mass Spectrometry (CAMS) is selected as a top student presenter at the Seismological Society of America meeting in Monterey.

"These scientists, engineers and inventors are national icons, embodying the very best of American ingenuity and inspiring a new generation of thinkers and innovators. Their extraordinary achievements strengthen our nation every day — not just intellectually and technologically but also economically, by helping create new industries and opportunities that others before them could never have imagined."

—President Obama, describing the National Medal of Science recipients.

Gina Bonanno

LLNL's **Special Response Team** finishes third at the U.S. National Special Weapons and Tactics (SWAT) Championships, an international competition in Tulsa, Okla. The competition consists of eight "live-fire" events with teams competing head-to-head.

Theoretical physicist **Kennedy Reed** is named by President Obama as a recipient of the prestigious Presidential Award for Excellence in Science and Engineering Mentoring.

Dave Menshew, a science teacher at James C. Enochs High School in Modesto, and a participant in the Lab's Teacher Research Academy, is named the first-place recipient of the 2009 Genzyme-Life Technologies Biotech Educator Award.

Lynford Goddard, a former postdoc in the Lab's Engineering Directorate, is named by President Obama as a recipient of the Presidential Early Career Awards for Scientists and Engineers (PECASE).

The Lab receives the President's Volunteer Service Award from the Northern California Blood Services Division of the American Red Cross in recognition of **employee commitment to the community through blood donation**.

Lyudmila (Mila) Shapovalov, an administrative specialist in the Physics Division of the Physical and Life Sciences Directorate, receives a $1,250 scholarship from the Lawrence Livermore Laboratory Women's Association — her second from that organization. Shortly thereafter, she receives a Silver Jubilee Scholarship of $2,000 from the American Association of University Women (AAUW), San Francisco Branch.

Lab researchers and business development executives garner four technology transfer awards in the Federal Laboratory Consortium's Far West Region competition

Lab physicist **Omar Hurricane** receives DOE's 2009 E.O. Lawrence Award for work in the weapons program.

Physical and Life Sciences Associate Director **Bill Goldstein** is named a fellow of the American Association for the Advancement of Science (AAAS).

Lab researchers **David Bradley, Laurence Fried, Arthur Molvik, Scott Wilks and Christine Orme** are named fellows of the American Physical Society (APS).

Jeff Latkowski of Engineering is recognized by Fusion Power Associates with an award of excellence for his leadership and contributions to fusion energy.

Gina Bonanno, a NIF program manager and head of NIF's National Ignition Campaign since 2005, is inducted into the Alameda County Women's Hall of Fame.

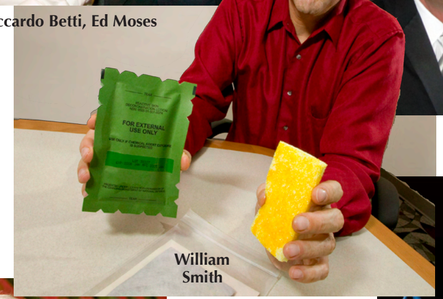
LLNL researchers are honored with eight R&D 100 Awards in technologies judged to be among the top 100 industrial innovations worldwide in 2008.

Mathematician **Panayot Vassilevski** receives a Fulbright scholarship, allowing him to spend a semester teaching a graduate-school class in computational mathematics at the St. Kliment Ohridski University of Sofia, Bulgaria, the university from which he received his Ph.D. in mathematics (numerical analysis) in 1984.

Artie Rodgers, the Lab's seismology group leader, heads to Grenoble, France in January 2010 under a Fulbright Scholarship to study the relationship between topography and seismology with computer modeling at Laboratoire de Géophysique Interne et Tectonophysique (LGIT), Université Joseph Fourier.

Riccardo Betti, Ed Moses

Mark Seager, Berni Alder



William Smith

Bill Goldstein

Panayot Vassilevski

Note: Pictures and images shown on these two pages are just a selection of awards and achievements from 2009. Space limitations don't permit a complete listing of all awards and achievements received this past year.

Kennedy Reed

Victor Reis, senior adviser in the Office of the Secretary of Energy, is presented with the James R. Schlesinger Award, after being nominated for the award by LLNL Director George Miller.

Lynford Goddard

Scott Samuelson

Fred Mackie

Rick Ryerson

Ruth Tinnacher

Mila Shapovalov

2009 IN REVIEW

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Operations

More than 14,000 employees, family and guests attend the **Laboratory's Family Days Open House.**

The Laboratory restricts nonessential business travel to Mexico in response to an outbreak of the **H1N1 flu virus.** The Lab continues to monitor for H1N1 virus on site. The LLNL influenza response team focuses on minimizing risk or exposure.

The Lab returns to lead the role in o**n-site treaty inspections.**

Energy Secretary Steven Chu details President Obama's $26.4 billion fiscal year 2010 budget request for DOE.

NNSA releases its FY 2010 budget request that includes $9.9 billion to support the National Nuclear Security Administration missions.

Emergency communications in southern San Joaquin County receive a helping hand from a radio system located at the Laboratory's experimental test site, Site 300.

> "Given the world's current heavy reliance on fossil fuels, nations must pursue a wide range of carbon mitigation strategies, and carbon sequestration could be one of the most critical and quickest ways to do this in the short-term."
>
> **– Julio Friedmann, leader of the Lab's Carbon Management Program.**

The **1400 trailer complex**, which consists of some of the oldest trailers on site, is demolished.

The Laboratory successfully completes Phase I certification of its NNSA Integrated Safety Management System (ISMS).

Site 300 conducts its annual controlled burn for fire prevention.

The inaugural class of the Laboratory's **National Security Leadership Program (NSLP)** completes the year-long program from Texas A&M University's Bush School of Government and Public Service.

JUNE

Science & technology

Researchers representing 13 U.S. government science agencies, major universities and research institutes, including Lawrence Livermore, produce a study entitled **"Global Climate Change Impacts in the United States."**

The Weapons and Complex Integration and Science and Technology principal directorates celebrate the successful completion of the **Transformational Materials Initiative.**

Lab researchers Jonathan Allen, Tom Slezak and their team use computer models to determine that the **H1N1** may not be as virulent as first thought: it's just not in its DNA.

S Program's **Interagency Biological Restoration Demonstration (IBRD)** program is a wide-area biological remediation plan to strengthen the U.S. response to and recovery from a large-scale, wide-area attack involving the release of a biological agent.

A $6-million, five-year proposal funded by the Department of Energy's Office of Science, Biological and Environmental Research (BER), allows about a dozen LLNL scientists to study **Plutonium transport** at concentration levels

Kim Cupps, High-Performance Systems division leader, and Mark Seager, assistant department head for Advanced Technologies, inspect a newly installed rack for Dawn, a 500-teraFLOP/s (trillion floating operations per second) IBM BlueGene/P system.

at the picomolar to attomolar scale (10^{-15} to 10^{-18} moles/liter, equivalent to dissolving one grain of salt in 100 Olympic-size swimming pools).

Through a memorandum of understanding, the nonprofit organization, the Arc of Hilo, begins processing tropical foods on the island of Hawaii with the aid of **two energy technologies** developed by LLNL scientists.

People

Cherry Murray bids farewell to the Laboratory to become the first female dean of the new School of Engineering and Applied Science at Harvard University.

Tomás Díaz de la Rubia is appointed acting principal associate director for Science and Technology.

Kathleen Shingleton of the Hazards Control Department is elected president–elect of the American Academy of Health Physics (AAHP).

LLNL's postdoctoral researchers present their research at the second annual Institutional **Postdoctoral Poster Symposium.**

Patrick Dempsey of the Director's Office completes the Half Ironman 70.3 Hawaii Triathlon on the big island of Hawaii.

Lab employee **Neil Joeck** begins working in the Office of the Director of National Intelligence (ODNI) in Washington, D.C.

William Bruner, director of Government and External Relations, and **Michael Mosby**, Six Sigma expert and project leader, get a taste of the West at the Livermore Rodeo's cattle penning competition.

Teachers from as near as Tracy and Manteca and as far as Hawaii gather at the **Lab's Edward Teller Education Center** to begin their summer internship program.

Four local high school seniors from Livermore and Tracy are awarded LLNL's **Edward Teller Science Scholarship.**

Engineering's **James Leadstrom** dies as a result of a vehicle accident at the Lab.

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Operations

In an all-hands address, **Director George Miller** says that transition is over and the Laboratory is now well positioned to seize opportunities to play an expanded national security role and apply its capabilities to other challenges.

The new **Planning and Financial Services (PFS)** Directorate is created, integrating the activities of the CFO Directorate and the project controls functions from the Operations and Business principal directorate.

The DOE/NNSA changes the submission date from July 1 to Oct. 1 in the **Compensation Increase Plan (CIP)** approval cycle. The Laboratory delays all aspects of the performance evaluation process by three months.

The Lab hosts the tri-annual business meeting of the General Counsels for **Federally Funded Research and Development Centers (FFRDCs).**

The Lab asks for volunteers to be early adopters of **Microsoft Exchange,** which eventually will replace LLNL's current e-mail and calendaring systems.

The "Quick Entry Screen" feature of the LLNL **Issues Tracking System (ITS)** is launched, which allows employees to easily submit issues and ideas about safety, security, environment, quality, emergency management, business or other Lab functions**.**

LLNS kicks off its annual **community gift program** to benefit local and area non-profit organizations.

A **grass fire** that starts at Site 300 burns more than 2,100 acres before being contained.

The Employee Concerns Program launches a new Web-based system called **Employee Voice** that employees can use to report concerns — anonymously if desired — about wasteful, fraudulent, illegal or hazardous activities.

Juneteenth is celebrated with spoken word artist Indigo.

The Lab celebrates **"Pride Month."**

Science & technology

DOE funds three new LLNL proposals for **geothermal research.**

The Lab produces **energy flow charts** for DOE that show that Americans used more solar, nuclear, biomass and wind energy in 2008 than they did in 2007.

Lab scientists **Olgica Bakajin and Aleksandr Noy** publish findings in *Nature Nanotechnology* describing research in using protein-based membranes for water transport.

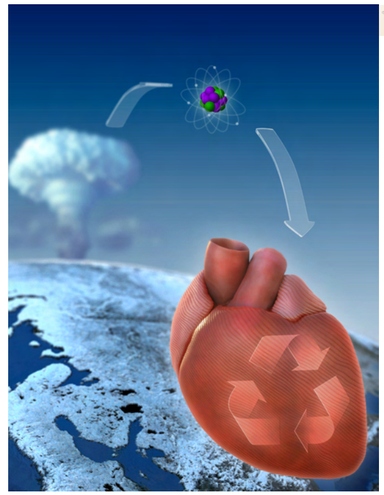
More than a dozen LLNL scientists participate in the July 2009 **Actinides International Conference** in San Francisco.

Operations

The Laboratory institutes a **Quality Assurance Office (QAO)** to provide the required planning, resources, processes, training and independence that are essential to attain the Laboratory's goals.

The Laboratory contracts with a commercial lead recycling firm to **recycle spent lead bullets** from a firing range at Site 300.

The **Alameda County Sheriff's Department** begins supporting the Protective Force Division for routine traffic control and law enforcement.



By looking at the amount of carbon 14 in the atmosphere from above-ground nuclear testing in the 1950s and 1960s, researchers have determined that cells in the human heart develop into adulthood.

IN REVIEW 2009

The number of new **record of invention (ROI)** applications filed by LLNL inventors soars in the second quarter of 2009.

A new **Recovery Act Office,** led by Patrick Dempsey, opens to help communicate American Recovery and Reinvestment Act (ARRA) opportunities to Lab program and technology leaders.

Site 300 witnesses the return of a threatened raptor species, the **Swainson's hawk** *(Buteo swainsoni)*.

People

The Lab's annual **Day on the Green** diversity event takes place.

The third annual Lab **Active for Life** campaign celebrates another successful finish line event.

Livermore's new poet laureate, **Charan Sue Wollard,** whose daughter Jessica works at the Lab, begins her new term with a poem about the National Ignition Facility, entitled "Stellar Gest."

AUGUST

Science & technology

Laboratory researcher **Amitesh Maiti** develops a screening method that would use ionic liquids — a special type of molten salt that becomes liquid under the boiling point of water (100 degrees Celsius) — to separate carbon dioxide from its source, making it a cleaner, more viable and stable method than current techniques.

The Laboratory receives $810,000 in **American Recovery and Reinvestment Act** funding for fusion energy research.

In research appearing in the *Proceedings of the National Academy of Sciences*, Laboratory scientists and a group of international researchers find that the quality of computer models does not affect the ability to identify human effects on atmospheric water vapor, which amplifies **the warming effect of increased levels of carbon dioxide**.

Lab researchers devise a versatile hybrid platform that uses **lipid-coated nanowires** to build prototype bionanoelectronic devices.

Newly published Lab research on the effects of blast waves could lead to an enhanced understanding of head injuries and improved **military helmet design**.

> "I went back into the military at my age (51) because I felt I had not done enough."
>
> **– Lee Gillette, who works in the LLNL Security Organization and was voluntarily recalled to active duty about two years ago to serve with a military police company in Baghdad.**

Operations

NNSA announces the first step toward the creation of the **Livermore Valley Open Campus (LVOC),** a joint venture between Sandia National Laboratories and LLNL that will promote greater collaboration with outside researchers and industry.

In a separate venture, LLNL and Sandia begin sharing some operational functions, as part of NNSA's Complex Transformation.

As part of its commitment to safety, LLNL offers **free bicycle helmets** to Lab employees through a new ongoing institutional program.

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2009 IN REVIEW

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Demonstrators taking part in the annual **Hiroshima Day** observance block the West Gate entrance to the Lab for several hours.

People

Julio Friedmann, the Lab's Carbon Management Program leader; Jane Long, a principal associate director at-large; and Erik Storm, the director for Advanced Inertial Fusion Energy Programs, participate in workshops at the Council on Competitiveness' Western Energy Summit in Sunnyvale.

Bruce Schultz is named acting head of the Environmental Protection Department (EPD) within Environment, Safety, Health and Quality and Susi Jackson is appointed EPD senior environmental compliance adviser.

Glenn Mara, the Lab's former deputy director of Operations, is appointed the University of California associate vice president of Laboratory Programs.

Laboratory engineer **Jose Hernandez** lifts off from Cape Canaveral on Aug. 28 on a mission to the International Space Station, along with six crew members aboard the space shuttle Discovery.

SEPTEMBER

Science & technology

Calculations of laser–plasma interaction on the 500-teraFLOP/s **Dawn supercomputer** demonstrate groundbreaking science and enhanced code performance with some of the highest resolution, largest simulations ever run.

Southern California Edison's utility pole yard at **Visalia** is taken off the EPA's Superfund list. By using two LLNL-developed technologies (dynamic underground stripping and hydrous pyrolysis/oxidation), the site is cleaned up 100 years faster than originally estimated.

A multi-lab team, led by Livermore scientists, develops the **Regional Seismic Transit Time (RSTT)** model that greatly increases the accuracy with which small, distant nuclear explosions or other seismic events can be located.

> "The Web allows us to do a lot of cool stuff, but it is also a playground where those who want to harm us can."
>
> **– Tomás Díaz de la Rubia in an S&T all-hands update on the Roadmap to the Future**

Exciting results from National Ignition Campaign **hohlraum experiments** are presented at the Sixth International Conference on Inertial Fusion Sciences and Applications.

Operations

The **Environment, Safety and Health (ES&H)** directorate is formed, composed of the Environmental Protection, Hazards Control, Health Services and Safety Education departments and the Human Reliability Program Office.

Laboratory security police officers take first place in the 2009 **"Best in the West"** marksmanship contest.

The Laboratory's **hiring process** is streamlined and new processes and tools are introduced that allows business units to better manage their workforce needs.

Director George Miller presents the first annual **Institutional Operational Excellence Awards.**

Runners sprint down Outer Loop Road during the 2009 HOME Campaign run.

People

Steve Koonin, DOE under secretary for Science, visits LLNL for briefings on Office of Science-related Laboratory projects.

Security Director **Dave Leary** retires after a wide-ranging 36-year career at the Lab.

Lab employees paddling the **"We Be Dragon"** boat take second place in the novice division of the San Francisco Dragon Boat Festival.

OCTOBER

Science & technology

A project using the Lab's carbon nanotube technology is selected for funding by the DOE **Advanced Research Projects Agency–Energy (ARPA-E).**

LLNL signs a memorandum of understanding with **China's Thermal Power Research Institute** to pave the way for the Laboratory to be a major technical contributor in carbon sequestration and engineering technology for Green Gen, a Chinese demonstration project that will sequester carbon dioxide from a coal-based power plant.

Lab researchers contribute to the Clean Air Task Force report, **"Coal Without Carbon,"** calling for innovative federal policy approaches to lower the cost of reducing carbon emissions from coal-based energy.

LLNL scientists author five chapters of **"WMD Terrorism: Science and Policy Choices,"** published by MIT Press.

Operations

A new and improved **Employee Center Website** is launched that provides easy navigation to resources for career development, training and education, activities and volunteering and new employee information.

FrontRange Self Service is adopted as the Lab's new technical support system for desktop computers.

Auditors from the Office of Environment, Safety and Health Evaluations within DOE's Office of Health, Safety and Security spend two weeks at the Laboratory's main site and Site 300.

Bldg. 691, which had been sitting idle since the Large Optics Diamond Turning Machine was dismantled, is "repurposed" to house several new tenants, including the Radioactive and Hazardous Waste Management Division, the hydrogen test vehicle group and new high-pressure testing and development labs.

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A plasma is generated by a laser pulse similar to how sound is converted to light.

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NNSA announces that the Laboratory has removed two-thirds of its special nuclear material (SNM) requiring the highest level of security protection.

People

DOE Secretary **Steven Chu** makes his first visit to LLNL and gives an all-hands presentation to employees.

Michael Dell, founder and CEO of Dell, Inc., visits the Laboratory.

The first **National Day of Remembrance** for nuclear weapons workers and uranium miners, millers and haulers is observed at the Laboratory.

The 35th **HOME (Helping Others More Effectively)** Campaign is launched with the annual Run for Home.

A new **leadership development program** is launched in partnership with the UC Berkeley Haas School of Business.

NOVEMBER

Science & technology

"A Roadmap for U.S. – China Collaboration on Carbon Capture and Sequestration," a report by the Asia Society Center and Monitor Group in which the Lab's Julio Friedman collaborated, is released.

The **LINAC Coherent Light Source** located at the Stanford Linear Accelerator, the world's first large-scale X-ray free-electron user facility, begins experiments. Lab scientists are among those who characterize the world's brightest X-ray laser beam.

Lab **carbon nanotube technology** that can be used for desalination is licensed to Porifera, Inc., of Hayward.

The **Grand Challenge** computing program awards time on LLNL supercomputers to 17 collaborative research projects totaling 7.5 million CPU hours/week.

An unorthodox supercomputing strategy developed by a Lab team led by Jim Glosli is a **finalist for the Gordon Bell Prize** at SC09 in Portland, Ore.

CAMS holds a workshop on "Accelerator Mass Spectrometry for Pharmaceutical Research" at LLNL.

Lab scientists determine the **melting temperature of diamond** under extreme pressure and temperature. The findings, published in *Nature Physics*, are important to understanding the nature of giant planets.

Global Security launches a series of nuclear forensics seminars.

Warren (Pete) Miller, assistant DOE secretary for Nuclear Energy, discusses the future of DOE nuclear energy programs in an LLNL presentation.

The **Lab ranks third** among the Top 20 geoscience institutions according to a *Times Higher Education* ranking. The ranking is determined by journal citation counts.

Operations

The Health Services Department holds a series of **H1N1 flu clinics** for priority groups identified by the Centers for Disease Control.

The Lab inaugurates the **Worklife blog,** a forum for employees to exchange ideas on work-life issues.

For the first time, the Lab hosts the D**OE Contractor Attorneys Association** annual conference.

Lab ride VI, a Veterans Day motorcycle ride from LLNL's main site to Site 300, raises $2,200 for the "Hope for the Heart" food bank.

The **Industrial Partnerships Office** moves to Trailer 1677.

People

Parney Albright is named principal associate director for Global Security.

Michael Merritt is appointed associate director for Nuclear Operations after serving in an acting capacity since May.

Former Lab Deputy Associate Director **Phil Coyle** is nominated as associate director for National Security and International Affairs in the U.S. Office of Science and Technology Policy.

The Lab hosts an event to show appreciation for **foreign national employees.**

DECEMBER

Science & technology

Researchers' achievement of a deeper understanding of how **biomolecules** manipulate the shape of growing crystals is published in the *Proceedings of the National Academy of Sciences*.

Laboratory researchers mentor students in a Next Generation Safeguards Initiative (NGSI) internship program, launched last summer with the aim of training future safeguards professionals.

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2009 IN REVIEW

Left, Spiros Dimolitsas, Georgetown's senior vice president and former LLNL Engineering associate director, and LLNL Acting Science and Technology Principal Associate Director Tomás Díaz de la Rubia sign a memorandum of understanding for collaborative work.

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LLNL theoretical physicists **Per Söderlind and Alex Landa,** publish findings about newly discovered features of transition metals that contradict the conventional explanations for phase stability. These appear in *Physical Review Letters*.

Lab researchers attend the **climate conference** in Copenhagen, Denmark.

People

Principal Associate Director for Business and Operations **Frank Russo** bids farewell to the Laboratory after being assigned by Bechtel to Hanford in Richland, Wash.

Newspaper columnist and author **Kelly Corrigan** visits the Lab to discuss her book, "The Middle Place."

Operations

NNSA laboratory directors meet with **Vice President Joesph Biden** to discuss the Stockpile Stewardship Program.

LLNS receives high marks from NNSA for its management of the Laboratory.

The Help Others More Effectively, or **HOME Campaign,** raises a record $3 million.

The Lab receives **ISO 14001** international certification for its Environmental Management System. This means LLNL meets the standards of the International Organization for Standards (ISO).

The Lab signs a pact for **collaborative work with Georgetown University.**

Tomás Díaz de la Rubia provides an update on the five-year "Roadmap to the Future" science and technology investment plan.

The Lab's **Science and Technology Education Program** hosts a visit by the San Ramon Valley Unified School District to explore areas for collaboration in science education.

NOTABLE QUOTES

"We have ideas of how we can make truly revolutionary advances in energy. We just need a mandate to do it."

— George Miller, speaking at the Council on Competitiveness' Western Energy Summit

"The physics that drive changes in water vapor are very simple and are reasonably well portrayed in all climate models, bad or good. Even with the computer models that performed relatively poorly, we could still identify a human effect on climate."

— Ben Santer, of LLNL's Program for Climate Model Diagnosis and Intercomparison

"The rapidly increasing performance of new supercomputers, such as Dawn, allows us to perform calculations unimaginable only a few years ago."

— Denise Hinkel, Plasma Theory Group Leader, AX Division

"We are at the nexus of major scientific, energy resource and policy issues and debates."

— Ed Moses, principal associate director for NIF and Photon Science

"Our team performed superbly in a tough competition against much larger law enforcement departments."

— Chuck Johnson, head of the Protective Force Division

"I've always believed that individual interest shouldn't overshadow the interests of the institution."

— Dave Leary, soon-to-retire Director of Security

"Getting this project was no easy task. It was one project from an initial candidate list of more than 3,700 projects submitted to DOE."

— Patrick Dempsey, head of the Lab's Recovery Act Office

"We spend so much time working on the technical details of what we do. Writing for this book gave us an opportunity to step back and think about the broader perspective of our work and how it fits into the larger context of addressing the WMD terrorism threat."

— Simon Labov, LLNL physicist and detection chapter coauthor

"The removal of two-thirds of LLNL's nuclear material demonstrates real progress and is the result of some very hard work."

– Tom D'Agostino, NNSA Administrator

"It [NIF] is a marvel. . . we need to think about what we should be doing in a year or two from today."

– Steven Chu, Secretary of Energy

"Many of my high-school classmates became sailors. I thought about it, but I was encouraged by a teacher to go into math and with math I have been able to travel far."

– Panayot Vassilevski, Lab mathematician and Fulbright grant recipient